



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/498,303	02/04/2000	Yong-Pil Han	MIT7941	8629

7590

03/13/2002

Theresa A Lober  
T A Lober Patent Services  
45 Walden Street  
Concord, MA 01742

EXAMINER

DANG, THI D

ART UNIT

PAPER NUMBER

1763

4

DATE MAILED: 03/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Applicati n No.

09/498,303

Applicant(s)

HAN ET AL.

Examiner

Thi Dang

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-14 and 16-21 is/are allowed.
- 6) ☒ Claim(s) 1-11 and 22-24 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka* et al (5,288,333).

*Tanaka* discloses a wafer cleaning method in which a mixture of HF and H<sub>2</sub>O vapors is applied to the surface of a semiconductor device at a temperature above its dew point (cols. 11-12). The pressure and temperature conditions are controlled during cleaning to prevent aerosol formation, thus, allowing uniform etching. It is obvious that no more than a sub-monolayer of etch reactants is formed on the semiconductor device in *Tanaka's* method because *Tanaka's* method involves etching with HF and H<sub>2</sub>O vapors as in the case of applicants' method and the pressure and temperature are controlled so as to prevent aerosol formation. It is expected that any reaction products formed on the surface of the semiconductor device during *Tanaka's*

Art Unit: 1763

method would be vaporized. The claims broadly recite that the pressure and temperature conditions are controlled to produce a monolayer or sub-monolayer of etch reactants, but no specific pressure or temperature is stated. In addition, the term "submonolayer" is broad in its scope, and thus, does not further limit the claims in the way that would define the claimed method over that of *Tanaka*. As broadly claimed, applicants' method does not define over that of *Tanaka*.

Claims 7-11 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Rose et al.*

*Rose* discloses a method for removing an oxide layer from a semiconductor device in which the oxide layer is exposed to an aerosol of frozen particles and a mixture of HF and water vapor (col. 5, lines 1-24). It is obvious that no more than a sub-monolayer of etch reactants is formed on the semiconductor device in *Rose's* method because *Rose's* method involves exposing the oxide layer to frozen particles and etching with HF and water vapors as in the case of applicants' method.

#### ***Claim Objections***

Claims 9, 10, 15, 23, 24 are objected to because of the following informalities: The term "to from" in each of the above claims contains a spelling error; it should be changed to -- to form--. Appropriate correction is required.

#### ***Allowable Subject Matter***

Claims 12-14 and 16-21 are allowed.

The application having been allowed, formal drawings are required in response to this Office Action.

Art Unit: 1763

***Conclusion***


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jeng et al and Watanabe et al are cited to show prior art methods of removing oxides that are related to the claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ms. Thi Dang whose telephone number is (703) 308-1973. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

TD  
March 12, 2002

  
**THI DANG**  
**PRIMARY EXAMINER**  
**GROUP 1700**